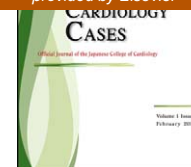




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## Case Report

# Subclavicular screwed wire transient pacing to increase safety of transcatheter aortic valve implantation with the CoreValve system

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## KEYWORDS

Transcatheter aortic valve implantation;  
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**Summary** Regarding the risk of atrioventricular block during the first days following transcatheter aortic valve implantation (TAVI), temporary pacing is required. Conventional transfemoral temporary pacing catheters have several drawbacks including the risk of cardiac perforation, infection, and the absence of any fixation mechanism. We describe a case of TAVI procedure with safer temporary pacing, using subclavicular active-fixation pacemaker electrode and external generator.

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## Introduction

Transcatheter aortic valve implantation (TAVI) has shown great promise in the treatment of severe aortic stenosis in patients not eligible for conventional surgery [1]. In contrast to conventional valve replacement surgery, TAVI induced inevitable compression of the annulus and surrounding structures, including the atrioventricular (AV) node and its left bundle branch. Requirement of a permanent pacemaker implantation (PPI) in the short term, rises from 3% to 6% [2] with conventional surgery, to more than 20% with the Medtronic CoreValve autoexpandable device (Medtronic, Irvine, CA, USA) [3,4]. Temporary transfemoral cardiac pacing is consequently recommended regarding the risk of AV

block during the 3–5 days following TAVI procedure. Traditional temporary pacing catheters have several drawbacks including the risk of cardiac perforation, infection and the absence of any fixation mechanism. We describe a case of TAVI procedure with temporary pacing using subclavicular active-fixation pacemaker electrode and external generator.

## Case report

An 85-year-old woman was admitted to out hospital for symptomatic severe aortic stenosis. This patient was eligible for TAVI procedure because of very high surgical risk with a EUROSCORE of 27%. To avoid transfemoral temporary pacing, we realized the day before valve implantation a safer approach. Using a 7Fr peel-away introducer sheath, a bipolar active-fixation permanent pacing lead was positioned in the right ventricle under fluoroscopy guidance with the tip screwed into the apical septum (Fig. 1). The lead was stitched to the skin using the anchoring sleeve, then

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**Figure 1** Active fixation lead is connected to a reusable generator secured to the skin with a large occlusive dressing to maintain sterility.

connected to a VVI permanent pacemaker which had been pre-programmed bipolar for stimulation and detection (rate 60 bpm, output 5V). This was secured to the skin with an occlusive sticking (Fig. 2). We used a desterilized recuperation pacemaker for cost-effectiveness.

The Transfemoral CoreValve prosthesis implantation was performed the day after under general anesthesia and has been previously described [3]. We performed first an aortic valvuloplasty with a NuCLEUS PTV balloon (NuMED, Hopkinton, NY, USA), the original device design allows to avoid rapid pacing. After this predilatation a 23-mm prosthesis was deployed with excellent final results. The patient was extu-



**Figure 2** Chest radiography showing the position of the pacing lead. The active-fixation screw mechanism and the CoreValve are visible.

bated 4h after procedure and left the coronary care unit (CCU) for a general cardiology ward after 24h. We observed no changes in AV conduction and external pace-maker was removed at day 5 without any complication.

## Discussion

The reported incidence of permanent pacing for new AV block can reach more than 20% after TAVI with the CoreValve bioprosthesis, resulting in the inevitable intrinsic compression of the fibrous skeleton of the heart, including the conduction system adjacent to the aortic non coronary cusp. However, there is also a significant recovery in electrocardiographic parameters of cardiac conduction with time, resulting in a low pacing requirement for many patients receiving early permanent pacemakers [5]. These data suggested a prolonged period for temporary pacing to avoid some unjustified implantation. However, several complications may occur with long-term temporary transfemoral pacing including tamponade, subsequent displacement because of the absence of any fixation mechanism, infection, or ventricular arrhythmias [6,7]. The requirement for transfemoral temporary pacing support with these potential problems and prolongation of the immobilization of the elderly patient, greatly lowers our threshold for early permanent pacemaker. The use of active-fixation electrode with external pace-maker is probably interesting in this context. Active fixation lead can be easily positioned by subclavicular way and connected to a generator with a high output in bipolar mode secured to the skin. Although myocardial perforation using permanent pacing leads has been reported following pacemaker implantation [8], this is very uncommon. It allowed moreover rapid ambulation and reduced the infection risk. The increased cost of the electrode is easily offset by the reduction in complications, reduced CCU stay and potential avoidance of PPI.

The present case described an alternative method to transfemoral pacing to lower the risk of complication and shorten the length of hospital stay, which potentially improves outcome after TAVI in elderly patients.

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